

## SLOT CAR RACING TOY WITH MANUAL SPEED CONTROL

### Field of the Invention

5        This invention relates to toy racing cars, and in particular relates to a manually-driven speed controller of a slot car.

### Background of the Invention

10        Toy slot cars, as shown in Figure 1, are popular toys which usually consist of a track 01 and one or more cars 02. The track 01 is a closed route that is formed by a number of connected track elements. Slots 011 are formed in each track element so that when the elements are connected the track 01 is provided with at least one continuous slot along which a car 02 may run. As is well known on both inner and outer sides of each slot there are provided electrically conducting strips 012 for  
15        supplying electrical power to the car. As shown in Figure 2, a guiding axle 021 is provided at the bottom of a car 02 for guiding the car along the track and conducting friction elements 022 (such as a conducting brush) are installed on both sides of the guiding axle 021 so as to be able to pick up electrical power from the slot.

20        In addition, a power unit 03 is usually installed somewhere at the outer side of track 01, of which the positive and negative electrodes are connected to the conducting strips 012 that are on both sides of the slot 011 respectively. When the two cars 02 (A, B) are placed on the track 01 and their guiding axles 021 are fitted into slots 011, the conducting brushes 022 of the cars 02(A, B) contact the conducting strips 012 on both sides of slots 011. When the switch of power unit 03 is turned on,  
25        cars 02A and 02B will be powered up and start to run along the slots 011 of the track 01. Conventionally the power unit will be battery-powered or connected to an electrical mains supply.

30        To enhance the fun of the slot car, a race between the two cars can be arranged. The cars can run quite quickly along straight line parts of the track, but they need to be run more slowly in the curvilinear parts of the track so as to prevent the cars from

running off the track due to centripetal force. To achieve this, the conventional slot cars are also equipped with a control unit for adjusting car speeds, which may function may be implemented through the following two methods: One of the methods is to connect a slide resistance to the circuit formed by the slot car, in which  
5 case the speed of the car can be altered by changing the resistance value of the slide resistance and the strength of current in the circuit which thus changes the strength of current provided to the car (see Figure 3). Another method is to change the voltage of the input circuit, which can be realized using option switch 03, as shown in Figure 4. When the switch 03 contacts with A, B, C respectively, the voltage of the input circuit  
10 will change simultaneously and thus the speed of car 02 will be changed accordingly.

### **Summary of the Invention**

According to the present invention there is provided a slot car toy comprising a  
15 track having at least one slot and at least one toy car adapted to engage said slot and run on said track, wherein said toy car is adapted to receive electrical power from said slot and wherein manually driven electrical power generating means is provided for supplying electrical power to said slot.

In preferred embodiments of the invention the electrical power generating means  
20 may comprise, for example, a hand-operated generator, a foot-operated generator or a treadmill-operated generator.

Preferably a plurality of tracks may be provided with respective manually driven electrical power generating means associated with each track.

In a preferred embodiment the slot car toy may also comprise a sound generating  
25 means powered by the manually driven electrical power generating means.

### **Brief Description of the Drawings**

Some embodiments of the invention will now be described by way of example and with reference to the accompanying drawings, in which:-

30 Figure 1 is a schematic diagram of a conventional product,

Figure 2 shows a conventional slot car on a track,  
Figure 3 is a circuit diagram showing a first known method of speed control,  
Figure 4 is a circuit diagram showing a second known method of speed control,  
Figure 5 is a schematic diagram showing an embodiment of the present  
invention,  
Figure 6 is a schematic diagram of a method of power transmission according to  
a first embodiment of the present invention,  
Figure 7 is a schematic diagram of a method of power transmission according to  
a second embodiment of the present invention,  
Figure 8 is a schematic diagram of a method of power transmission according to  
a third embodiment of the present invention,  
Figure 9 is an illustration of one possible hand-operated electric generator for  
use in an embodiment of the present invention, and  
Figure 10 is an illustration of another possible hand-operated electric generator  
for use in an embodiment of the present invention.

### **Detailed Description of Preferred Embodiments**

As shown in Figures 5 and 6, a toy slot car system according to an embodiment of  
the present invention includes track 1, at least one car 2, a manually-driven electric  
generator 3, and an electrical sound-effect unit 4. Track 1 is a closed path loop that is  
formed by a number of connected track elements. Each track element includes at least  
one slot 11, preferably two parallel slots, so that when the track elements are  
connected together to form the complete track 1 two slots 11 are formed on each of  
which a car may be run so that two cars can use the track at the same time and can  
race each other as is known in the prior art.

As in the prior art, conducting strips 12 are installed on both sides of each slot 11  
and each car 2 is equipped with a guiding axle 21 at the bottom for guiding the car  
along a slot and on both sides of which there are conducting friction elements or  
brushes 22 that serve as the power electrodes of car 2 and pick up electrical power  
from the slots 11.

In contrast with the prior art where batteries or a mains supply are used to provide the power to the slots, in a preferred embodiment of the present invention the anode and cathode of power outputs from a manually-driven electric generator are connected to conducting strips 12 that are on both sides of slots 11 and this manually-driven generator is used to power a car.

In an embodiment of the invention a hand-operated electric generator can be used for the manually-driven electric generator 3 which can also be designed as a foot-operated or treadmill-style electric generator.

Figure 6 shows one possible example of a hand-operated electric generator. In this embodiment a hand wheel 301 is turned by a user and this rotation will be transmitted to the rotating shaft of a micro-generator 305 through the gear case 302, drive gears 303 and 304. Consequently the micro-generator 305 outputs power to the electrical sound effect unit 4 and track 1 respectively via the power cord 306 through a series of intermediate circuits. Figure 9 illustrates a hand-operated generator that is adapted to be held by a user. The hand wheel 301 is provided on one side and a number of control buttons 40 for various functions (eg sound effects) can be provided. Alternatively the hand-operated generator may be a table-top model as shown in Figure 10.

By the term "manually-driven" electrical generator is any form of generator that outputs electrical energy in response to human effort and exertion. In addition to hand-operated generators other types such as foot-operated and treadmill-style generators could also be used.

The operating principles of foot-operated and treadmill-style generators are basically the same as those of hand-operated electric generators as shown in the example of Figure 7. When a user steps on the pedal 311, the belt roller 312 attached to the pedal rotates with the belt 313 which thus drives the rotating shaft 315 of the motor 314. The motor 314 supplies power to the electric sound effect unit 4 and track 1 via the power cord 316.

The structure and operating principle of treadmill-style generator are basically the same as that of the foot-operated generator as shown by the example of Figure 8. The

treadmill-style generator utilizes the mechanical energy that is generated by a user running on the plate of the treadmill-style generator to drive the rotating shaft 325 of the motor 324 with the belt roller 321, 322 and the belt 323, which thus makes the motor 324 output power and transmit the power to the electric sound effect unit 4 and track 1 via the power cord 326.

When using an embodiment of the present invention, the user should place the car 2 on the track 1 with the guiding axle 21 of the car 2 fitting into the slot 11, so that the conducting friction elements 22 on the car 2 contact the conducting strips 12 that are on both sides of the slot 11. Once the manually-driven electric generator is activated, it will generate the electric current and the car will be powered on by the conducting strips 12 and the conducting friction wafers 22, after which the car starts to run along the slot 11 of the track 1. During the course of running, the guiding axle 21 serves as the navigator of the car 2 to prevent it from derailing from the slot 11, whilst the conducting friction wafers 22 always keep in contact with the conducting strips 12 so that the power supply to the car 2 will not be interrupted. The speed of car 2 can be changed during the course of running by altering the rotation speed of the hand-operated electric generator, treadmill-style generator or foot-operated generator in order to change their output current, in which case the user will be able to manually control the car speed at any time as the circumstances may require. This would involve users' participation which helps to increase the fun of the toy as well as helping users to perform body exercise during the game.

In addition, the electric sound effect unit 4 is also powered by the manually-driven electrical generator so that, the electric sound effect unit 4 will start to play music (or other sounds) when the manually-driven electric generator 3 starts to generate electricity. Moreover, the loudness, volume, and frequency of the music can be altered by changing the current generated from the manually-driven electric generator 3, so that the music sounds rich and varied which adds more fun.

In order to provide more options for the players, the toy slot car system can also retain the structure of battery power used in existing products and a battery compartment is provided for this purpose. The player can then alternatively choose

batteries or manually-driven electric generator 3 for supplying power to the slot car.